PROCEEDINGS OF SCIENCE

Engaging young audiences in the history of Italian Physics: a new INFN tool to give new light to historical videos

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Promoting and sharing the audio-visual heritage of the history of Italian physics are the two main goals of "La Mediateca INFN: the history of physics through videos", the new cultural project of INFN, a website dedicated to a general audience, but in particular aimed at students of Italian schools and university researchers and students. Today, it includes almost 200 videos totalling more than 70 hours of interviews, documentaries, newscasts, conferences and seminars, giving rise to a digital archive open to everyone to do research, gather information, explore, and re-trace paths, anecdotes and events in the history of physics.
To make La Mediateca known especially by young students, a large in person and online event focusing on the project was organised. The event was followed by over 600 classes, with almost 12 thousand high school students that connected from all over Italy. La Mediateca was also at the heart of a contest for high school students, called "Audioritratti di Scienza" (Science Audioportaits): over 500 students participated in the contest, submitting 130 original podcasts.
These initiatives were evaluated through two different tools: an assessment questionnaire filled in by the students who participated in the contest and the analysis of the numbers and behaviours of the users visiting the website La Mediateca INFN, from November 2022 until today.
During this proceeding, the main features of La Mediateca INFN will be presented. Furthermore, the reach of the website, the results of questionnaire and the participation in the project's events will be discussed to understand how the history of physics can be a hook to engage young students and to make them closer to physics and science.

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1. Introduction

Italy has a long tradition in Nuclear and Subnuclear Physics, started in the 1930s with Enrico Fermi and his school, "I ragazzi di via Panisperna" [1]. Through the years, this tradition was strengthened by many more great scientists that led to breakthrough discoveries and advances in the field. To report these achievements, many videos, interviews, and documentaries were shot by scientific institutes, TV broadcasters, and film directors. Unfortunately, this highly fragmented scenario made it difficult to find and benefit from this vast cultural heritage. To fill this gap, "La Mediateca INFN. The history of physics through videos" was conceived. It is a cultural project designed to create a digital place where the audiovisual heritage on fundamental physics is collected, to preserve and value this historical heritage, and to share with society history, knowledge, and culture produced by fundamental physics research.
The proceeding is outlined as follows: after a first section where we introduce the "La Mediateca INFN" project and its website (Section 2), we present the launch event held in November 2022 (Section 3). In Section 4 we present the contest ideated to engage young students in the project. In Section 5 we show the social media campaign developed for advertising "La Mediateca INFN", while in Section 6 we draw our conclusions.

1. La Mediateca

The idea of "La Mediateca INFN" was first introduced by Romeo Bassoli, former head of the INFN Communications Office, to gather the vast heritage of videos in the different INFN archives, to include all new documentaries of historical interest that were shot at the time, and to look for additional material in the archives of other cultural institutions. The main targets of the project are the specialized research community, university and high school students and the wider public.
The development of the project was structured in five different phases:

1. a research phase;
2. a collection phase, in which the material of interest for the project was gathered;
3. a digitisation phase, that allowed to save videos that could have been otherwise lost;
4. a cataloguing phase;
5. a tailored web portal design and deployment phase;
6. a communication phase.

During the research phase, new videos are sought in the INFN and external archives. Moreover, new collaborations were undertaken. In particular, INFN started a collaboration with RAI Teche, the segment of RAI - the state Italian radio and TV broadcaster – devoted to the conservation and valorisation of their historical products. INFN also developed a strong partnership with Accademia Nazionale dei Lincei, an Italian scientific association and one of the most ancient scientific institutions in Europe, whose objective is the development of sciences.
Throughout the collection phase, the archives were scanned for videos of interest to the project. During the cataloguing phase, the videos gathered from the previous phases were catalogued according to ten categories, i.e. the type of video, year, short description, visible people, mentioned people, author/director, place, language, source archive, and some tagging keywords. Furthermore, long videos were divided into chapters, each one with a short description.
In the meanwhile, a tailored web portal has been developed, to host the videos and make them available to the public through a user-friendly interface[1]. The website is introduced by a homepage, where the project is presented to first-time visitors and some highlighted videos are displayed (*Figure 1*). Highlighted videos are updated regularly according to most recent news or developments in physics. For example, if the Nobel Prize is awarded to a particular field of research featured in "La Mediateca INFN", videos related to this topic are highlighted. When

[1] https://lamediateca.infn.it

you click on a video, under the video player a short description is displayed, along with some information about author, place, persons in the video or mentioned, year, language and relevant keywords (*Figure 1*). Videos are catalogued in five different categories: interview, newscast, conference, documentary, educational. It is possible to filter videos according to the selected category.

Figure 1. The homepage of La Mediateca INFN and an example of how a video is displayed

An advanced search tool has been made available for a more pinpointed search. It is possible to search according to all the different search fields.
As mentioned in the Introduction, long videos are divided into chapters, each with a short description. If the user clicks on the chapter description, the video is automatically loaded and played at the beginning of the chapter (*Figure 3*).
High resolution videos can be requested by filling in the appropriate form.
"La Mediateca INFN" has now 168 videos, lasting 76hours 8minutes and 48seconds, and they go from 1938 until 2018.

Figure 3. An example of a video with chapters on "La Mediateca INFN"

1. The launch

To make "La Mediateca INFN" known by its target audience and, especially, by young high school students, a large in-person and online event was launched in November 2022. The event

was held in the framework of the INFN 70th anniversary celebrations, and it was hosted in the high school Liceo Scientifico Virgilio, in via Giulia, Rome. This location was particularly relevant to the project due to its historical meaning, since in this school the muon was first observed during World War II, in an experiment run by Marcello Conversi, Ettore Pancini, and Oreste Piccioni [2].
To try to engage as many high school students as possible, a now popular scientist in Italy was invited: the 2021 Nobel Prize laureate Giorgio Parisi. The choice of involving Parisi was not only related to his popularity. During the phase of development of the project Parisi was the president of the Accademia dei Lincei, and the strong collaboration in finding new videos was forged also under his presidency. He was in charge of the digitalisation of a large archive of videos at the Accademia, as well. The project was presented also by INFN president Antonio Zoccoli, together with science journalist Silvia Bencivelli, who introduced and moderated the event.
At the event, four classes of the Liceo Virgilio were present, as well as 12.000 students, that were connected from all over Italy via the YouTube live streaming.[2]
After a presentation of the project and its features, a few videos of "La Mediateca INFN" were played live. They were the hook to tell some key moments in the history of Italian nuclear and particle physics, such as the reconstruction of Italian physics after World War II and great discoveries like W and Z bosons, the Higgs boson, and gravitational waves.
During the event the engagement of students was high. They had the chance to ask questions and over 700 questions were asked online.

2. The contest

The launch event was also the kick off of a contest for high school students, "Audioritratti di scienza" (in English, "science audio-portraits"). The objective of the contest was to further engage young students in the history of Italian physics and to show them all the contents and features of "La Mediateca INFN". The challenge of the contest was to create a five-minute long podcast sketching the portrait of a leading scientist in the history of Italian physics using audio extracts from "La Mediateca INFN". The prize of the contest was a trip to INFN Gran Sasso National Laboratories, the largest underground facility devoted to astroparticle physics in the world, and to get their podcasts published as an official INFN podcast series called "Radici" (in English, "roots") and advertised on INFN social media channels.
To help the students in the preparation and development of the podcast, four live events were held on INFN YouTube channel about the history of elementary particles, Higgs boson, gravitational waves, and black holes.[3] The guests of the events were leading scientists in these fields, and their role was to go through the milestones in the history of these areas of research. The live events were developed around some polls answered by the students and around videos taken from "La Mediateca INFN". Overall, the videos got around 10,500 views and the quizzes were answered by 153 participants.
Around 500 students, organised in 130 teams, from all over Italy submitted their podcasts. At the end of the contest a questionnaire was proposed to students to evaluate the project. As follows, some key results of the questionnaire are presented.
In *Figure 4a*, we notice that only a small percentage of students followed the launch event and only around a quarter of them joined the preparatory live events. It can hence be inferred that different people were engaged in the different phases of project, giving "La Mediateca INFN" more opportunities to be known by a wide audience. A further information coming out is that the students worked autonomously on the podcast, without the need of watching the live events, and basing their research mainly on the videos they could find on "La Mediateca INFN". This is also

[2] La fisica in Super8 | Presentazione de "La Mediateca INFN"
[3] La Fisica in Super8. Storie di scoperte

confirmed by the results shown in *Figure 4b*, where around 50% of the participants say they have used "La Mediateca" often or very often. Moreover, *Figure 4c* shows that the vast majority of students joining the contest have found "La Mediateca INFN" quite useful or very useful to find out more about the history of Italian physics.
Wider questions were also asked about the overall interest in physics, in history of physics and in "La Mediateca INFN", and how this interest has changed throughout the project. In particular, in *Figure 4d*, more than half of the students state their interest in physics has increased. Finally, we asked a straightforward question about the overall evaluation of the project: 90% of the participants answered that they would recommend this contest to their peers.

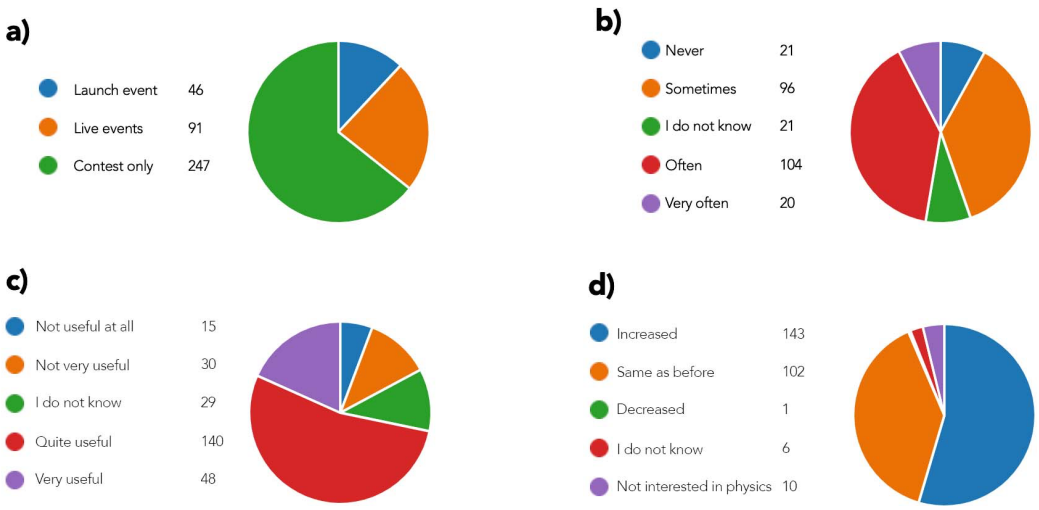

Figure 4. Key results of the questionnaire submitted to students - 262 responses.
The questions whose answers are displayed in the diagrams are:
(a) Which phases of the project have you joined?
(b) To create your podcast, how often have you visited "La Mediateca INFN"?
(c) How useful did you find "La Mediateca INFN" to find out more about the history of Italian physics?
(d) At the end of the project, your interested in physics has…

3. Social media campaign

At the same time of the launch event of "La Mediateca INFN", we started a social media campaign to reach a wider public, and in particular a young audience. This is why the INFN account on Instagram[4] was chosen as the main platform where the campaign was run: the main audience there is under 34.
The campaign was articulated in three phases. A first phase, starting from the beginning of November, consisted of the publication of subtitled videoclips taken from "La Mediateca INFN" as Instagram Reels. The objective of these clips was not only to advertise "La Mediateca INFN" itself, but also the live events we were running on YouTube at the time. The clips performed better than average videoclips on INFN Instagram account: the first videoclip got almost 14,000 views and over 1,000 interactions. It was hence decided to keep working on this format and from November 2022 to October 2023 31 historical Reels were posted on INFN Instagram account.

[4] INFN Instagram account, @infn_insights

The second phase involved posting these Reels in collaboration with other research institution's accounts. In particular, in February a Reel featuring a lecture by Paul Dirac of 1975 was posted together with CERN for the celebrations of Anti-matter Day. This Reel was the best performing content ever on INFN Instagram account. It got almost 300,000 views and almost 20,000 interactions. Moreover, throughout the summer 2023, a joint campaign was run together with Accademia Nazionale dei Lincei, featuring historical lectures held mainly in the 1970s at the Accademia, and now available on "La Mediateca INFN".
Finally, after the winning podcasts of the contest have been announced, some Reels were designed starting from the audio of the podcasts made by the students to advertise, besides "La Mediateca INFN", also the series of podcasts "Radici" (see Section 4). The objective of the campaign was reached, and the podcasts totalled 1655 downloads.
In Figure 5 we present the number of "La Mediateca INFN" webpage views across time. We notice some correlations with the different phases of the campaign and the number of page views. In particular, we see a spike at the launch event, as well as a drop after the podcast submission deadline. Moreover, some spikes are present, which correspond to the days when some of the Reels were published. For example, the second peak after January 2-8 is on the week when the Dirac Reel was posted.
Overall, the website got **13,223** page views from November 2nd until today.

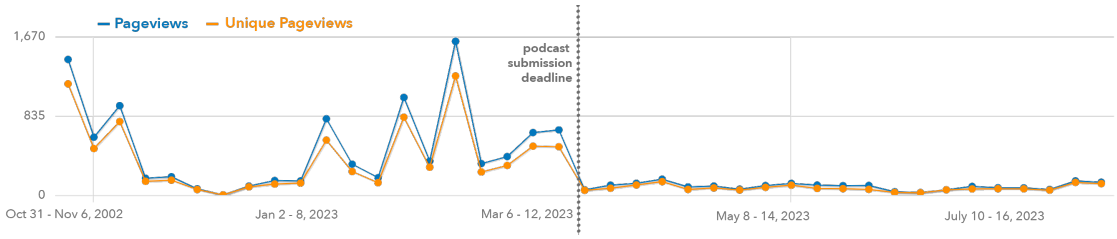

Figure 5. Time trend of "La Mediateca INFN" page views

4. Conclusions and outlook

"La Mediateca INFN" is a project to collect, preserve, and share videos about the history of Italian physics. We presented how this project was developed, and the communication and engagement campaign that has been put into place for making this tool known. A launch event was organized, to officially present the project to a vast audience of high school students, and this was followed by around 12000 students from all over Italy. After that, a contest for high schools was launched, to allow students to discover the possibilities offered by "La Mediateca INFN" and the history of Italian physics. As shown by a questionnaire submitted to participants, the contest and "La Mediateca INFN" were well received. At the same time, throughout one whole year, a social media campaign with historical video from "La Mediateca INFN" was run mainly on Instagram and it was noticed that the history of physics performed quite well on this platform, compared to other particle physics contents.
In the future, we expect to continue working on "La Mediateca INFN", by finding new videos to catalogue within our institution, and by undertaking new collaborations with other institutions. Moreover, we will keep working to find new ways for making this project known and to tell the beauty of the history of fundamental physics.

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References

[1] G. Battimelli, *Via Panisperna 89, Roma.*, asimmetrie INFN **09** (2009)

[2] G. Battimelli, *Muoni sotto le bombe..*, asimmetrie INFN **23** (2017)